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Journal of the Society of Arts.

FRIDAY, FEBRUARY 25, 1859.

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EXHIBITION OF 1861.

The following letter has been addressed to the Chairman of Council of the Society of Arts:—

17, Montague-place, 16th Feb., 1859.

Dear Mr. Dilke,—I send you a somewhat hasty reply to the inquiry you made of me, whether any data can be obtained from the results of past Exhibitions to justify a confident expectation that if the Exhibition of 1861 be properly organized—receive the cordial support of Her Majesty and Prince Albert—be supported by the Royal Commissioners of 1851,—and be liberally supported by home and foreign Exhibitors, its success will equal or surpass that of 1851.

Before we enter into details, let us first glance at the progress of Exhibitions generally.

The most striking instance is that of the Quinquennial Exhibition at Paris.

Here we find for a long series of years, that an Industrial and Fine Art Exhibition has attracted on each recurring period more visitors and more Exhibitors. No doubt then can exist that this period has been wisely chosen for France. The progress has been thus—

In 1789 there were ...	...	110 Exhibitors.*
,, 1827 ,, ...	...	1795 ,,
,, 1855 ,, ...	...	9799 ,,

Next let us refer to the progress of an Annual Exhibition at home, which has now been held for some years, viz., that of the Royal Agricultural Society:—

In 1844, at Southampton there were		2432 Visitors.*
,, 1851, at Windsor	,,	3397 ,,
,, 1858, at Chester	,,	6187 ,,

By this we see that each Annual Exhibition here, as each Quinquennial one has done in Paris, attracts more visitors and more exhibitors than its predecessors, and this no matter where the meeting is held, every part of the country showing an equal anxiety to take advantage of the information to be gained at such meetings.

Next let us examine into the facts connected with the Exhibition of 1851, and the minor and local Exhibitions which have followed it at a very humble distance, and then we shall be in a position to arrive at a fair inference as to the probable result to be anticipated from an Exhibition in 1861.

First we will place together the facts we have collected in a tabular form, thus—

	Visitors.	Receipts.	Population.	Price of Tickets and Number Issued.	Amount Realised.	Season Tickets and Amounts Realised.
LONDON—					£.	
Daily Admissions...	5,265,429	£356,278	2,300,000	£1 0s. 0d. ... 1042	1,042	No. 25,605
Season Tickets ...	773,766	£67,514		5s. 0d. ... 245,389	61,347	£67,514
				2s. 6d. ... 579,579	72,447	
				1s. 0d. ...4,439,419	221,971	
PARIS	4,593,576	£128,099	1,200,000	5f. ... 33,926	6,735	
				2f. ... 95,688	7,663	
				1f. ...2,097,607	83,904	
				4 sous ...2,182,433	17,459	
DUBLIN—						
Daily Admissions...	634,523	£28,981	254,000	5s. 0d. ... 2,225	556	No. 10,500
Season Tickets ...	366,745	£18,382		2s. 6d. ... 31,722	3965	£18,238
				1s. 0d. ... 422,965	21,148	
				0s. 6d. ... 132,457	3311	
CORK—						
Daily Admissions...	74,095	£2,874	86,000	2s. 0d. ... 6022	602	No. 1,474
Season Tickets ...	54,936	£1,545		1s. 0d. ... 18,937	946	£15,45
				1s. 6d. ... 1018	76	
				0s. 6d. ... 48,118	1203	
BIRMINGHAM	80,882	£3632	173,000	5s. 0d. ... 1339	335	
				2s. 6d. ... 195	24	
				1s. 0d. ... 51,609	2580	
				0s. 6d. ... 27,739	693	
MANCHESTER—						
Daily Admissions...	1,053,538	£60,506	340,000	2s. 6d. ... 131,608	16,451	No. 12,357
Season Tickets ...	283,177	23,014		1s. 0d. ... 856,256	42,812	£23,014
				0s. 6d. ... 65,674	1641	

The first fact we deduce from this table is the proportion the total number of visitors bears to the population of the places where the Exhibitions were held. These numbers are—

For London	2·62	visits	to 1	of population.
,, Paris	3·77	,,	,,	,,
,, Dublin	3·94	,,	,,	,,
,, Manchester	3·92	,,	,,	,,
,, Cork	1·5	,,	,,	,,
,, Birmingham............	0·467	,,	,,	,,

So that the visits, in proportion to the local population, at Paris, Dublin, and Manchester, considerably exceeded those in London.

If, however, we add together the visits to the Dublin, Cork, Birmingham, and Manchester Exhibitions, and the population of these towns, we shall find the aggregate visits were 2·98 to each of the population, while in London they were only 2·62; and if we compare the receipts in the same way, we shall find that £138,790 was realized, whereas in the same proportion to population as in London it would have been only £132,329.

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* Not to overload my letter with figures, I have quoted the results of the first, middle, and last Exhibitions.

But if we separate the numbers paying 1s. and under from the higher rates, the following result appears:—

In London, they were as	1·93	to 1 of population.
Paris	3·56	,, ,,
Dublin	2·18	,, ,,
Cork	0·792	,, ,,
Birmingham	0·45	,, ,,
Manchester	2·71	,, ,,

By which we see the wide field that is open for greater receipts in 1861 than in 1851, if we admit the people more freely, and at lower rates than 1s. each. The lowest rate at Paris was 4 sous, which produced £17,459 out of £128,000; at Dublin, 6d., which produced £3,311 out of £29,000; at Cork, 6d., which produced £1,200 out of £2,874; at Birmingham, 6d., which produced £691 out of £3,632.

These figures clearly prove that Exhibitions of very inferior merit to that of 1851, and to what is proposed in 1861, excited great general and local interest in their respective districts, and secured vast numbers of visitors. Even at a small provincial city like Cork, where a large proportion of its inhabitants are poor, and entirely outside the class able to pay to see an Exhibition, we find the number of visitors in proportion to the population, next to those in London.

We may also add, with respect to the Exhibition of 1851, that so little was it understood, and so limited was the circle of attraction at first, that it was not until the press teemed with accounts of its wonders that the people flocked to see it. The next will open under more favourable circumstances. The public are more instructed upon the value of an International Exhibition, and will be ready, in 1861, to accept its teaching, and enjoy its beauties and curiosities, if even it should be in some respects inferior to 1851.

Let us now try it by another test,—that of the receipts. The first result to observe is, the small proportion of the receipts obtained from the high rates of admission, and how entirely the success has depended upon the smaller contributions of the masses.

Thus, in Paris, the 5 francs and 2 francs produced £14,400 out of £128,000, or ·109 of the whole amount.

In London, the 20s., 5s., and 2s. 6d. produced £134,836 out of £356,807, or ·378 of the whole amount.

In Dublin, the 5s. and 2s. 6d. produced £4,521 out of £28,980, or ·156 of the whole amount.

In Cork, the 2s. and 1s. 6d. produced £678 out of £2,827, or ·239 of the whole amount.

In Birmingham, the 5s. and 2s. 6d. produced £359 out of £3,632, or ·098 of the whole amount.

In Manchester, the 2s. 6d. produced £16,451 out of £60,506, or ·272 of the whole amount.

Or by reversing this table we find that, in Paris, the 1 franc and 4 sous admissions produced ·891 of the total receipts.

In London, the 1s. admissions produced ·622 of the total receipts.

In Dublin, the 1s. and 6d. admissions produced ·844 of the total receipts.

In Cork, the 1s. and 6d. admissions produced ·761 of the total receipts.

In Birmingham, the 1s. and 6d. admissions produced ·902 of the total receipts.

In Manchester, the 1s. and 6d. admissions produced ·73 of the total receipts.

This plainly shows the great interest the people take in these Exhibitions, and to whom we must look for their main support—an interest quite apart from fashion or other accidental circumstances which affect the classes represented by season tickets.

From these figures we infer that if attraction be supplied for amusement and instruction at proper rates, the people will be candidates for admission.

In the above tables we have excluded season tickets, believing that if the Royal Commissioners of 1851 direct the Exhibition of 1861, and it is known that it excites the interest and attention of her Majesty and Prince Albert, the number of season ticket holders will equal, if not surpass those of 1851, for the foolish fears of many, and the ignorant prejudice and opposition of others, cannot in 1861 affect, as they then did, the sale of season tickets.

Then, when considering these results and applying them to another Exhibition, the increase of population interested in Arts, Manufactures, and Commerce, and the extension of trade in London since 1851, must not be lost sight of.

It is said, however, the people are tired of Exhibitions. What is the evidence of this? Is it to be found in the crowds who resort to comparatively trivial sights, or in those who attend whenever the attraction appeals more directly to the taste or the minds of visitors, and is of an educational character.

For instance, can an inference be drawn of any relaxation of interest in Public Exhibitions from the numbers who attended the opening of the Sydenham Crystal Palace, only three years after 1851—when the gorgeous richness and novelty of the one could be compared by nearly every visitor with the comparative feebleness and palpable imitation of the other, and when the recollections of the beauty, variety, and value of the articles so recently before their eyes were fresh in the memories of all. Yet before the opening of the Crystal Palace there were 20,183 Season Tickets sold at £2 2s. each, and even in the third season there were present, on one occasion, 15,867 Season Ticket-holders, besides 4,932 who paid half-a-guinea each at the door.

Or shall we refer to the Season Ticket Holders at Dublin and Cork.

At Dublin the receipts from them were £18,238, representing 366,745 visits; and at Cork £1,545, representing 54,936 visits.

The average number of visits by Season Ticket Holders:—

In London was	32·2	to each Ticket.
,, Dublin	34·9	,, ,,
,, Cork	37·2	,, ,,
,, Manchester	22·9	,, ,,

May we not then safely infer that if these results were realised so soon after 1851, larger proportionate results will be attained in 1861. If this inference be correct, then the receipts for Season Tickets may be safely relied upon to the full extent of 1851, say nearly £70,000.

Indeed, there is every reason to believe, that if the educational result of 1851 has produced such satisfactory results in the purely Local Exhibitions held since that time, the international character of the Exhibition of 1861 will place it so far above all these as to secure the greatest amount of success, and further we may expect, that as our rivalry with foreign manufactures in all parts of the world increases, so will the desire by Foreigners as well as Englishmen to see their mutual progress be increased, and thus secure to each decennial Exhibition a greater and greater amount of attraction.

To all these illustrations from the past success of Exhibitions we may add, as affecting the next Exhibition in London, the fact of the annually improving and increasing railway communication between the metropolis and the country, and between the distant parts of the metropolis itself; this will afford facilities for visiting the Exhibition to many who were excluded in 1851. But in addition to all these facts, we must not forget the large proportion of those who attended in Hyde Park that have since passed away and been replaced by others whose interest and curiosity will alike induce them to visit the next international Exhibition.

The extent to which the increased railway accommodation may contribute to the success of the Exhibition we have but meagre means to estimate, but if the increase of the traffic of 1851, during the period of the Exhibition was above 25 per cent., the same rate of increase in the traffic of 1861 will produce very much larger results, and as this increase of traffic in 1861 will arise very much from the larger area which will then be open to railway traffic, an equal result may be fairly expected. This is shown by the fact, that in 1851, the number of passengers by railway was 85,000,000, and that in 1857 it had increased to 140,000,000.

I am, Dear Mr. Dilke,
Yours faithfully,
WILLIAM HAWES.

C. Wentworth Dilke, Esq.,
Chairman of Council of the Society of Arts.

P.S.—I have had some difficulty in obtaining the figures relating to the Exhibitions. If not perfectly accurate, they are substantially so, and sufficiently so for all practical purposes.

EXAMINATIONS, 1859.—LOCAL BOARDS.

The following Local Boards have been appointed since the last announcement:—

For Belfast.

Rev. R. J. Bryce, LL.D.
Mr. Wm. Dunville.
Mr. Samuel G. Getty.
Rev. James McCosh, LL.D.
Mr. Joseph John Murphy.
Mr. Robert Patterson.
Mr. Hamilton Pink.
Rev. J. Scott Porter.
Mr. William Thompson.
Mr. George Orr Wilson.
Rev. Wm. Anderson, A.M., 23, Lonsdale-street, Belfast, *Secretary.*

For the Glasgow Athenæum.

The Very Reverend Thomas Barclay, D.D., Principal of the University of Glasgow.
Dr. W. G. Blackie, Publisher.
Mr. Ernest Dronké, LL.D., St. Vincent-street.
Rev. John Eadie, D.D., LL.D., Professor of Theology, U.P. Church.
Mr. James Gourlay, Banker.
Rev. William Hetherington, D.D., LL.D., Professor of Theology, Free Church College.
Mr. James McClelland, Accountant.
Mr. J. P. Nichol, Professor of Astronomy, Glasgow University.
Mr. Alexander Ritchie, Accountant.
Mr. John Strang, LL.D., City Chamberlain.
Mr. Michael Thomson, Insurance Agent.
Mr. Moses Provan, 110, West George-street, *Secretary.*

⁂ The Local Board, of which a list was published in the *Journal* for the 11th inst., is that for the Glasgow Mechanics' Institution.

For Lockwood.

Rev. John Barker, View-place, Lockwood.
Rev. J. B. Bensted, M.A., Lockwood Parsonage.
Mr. Bentley Shaw, J.P., Woodfield-house, Lockwood.
Mr. Alfred Lee, Mechanics' Institution, Lockwood, *Secretary.*

For Sheffield.

Rev. Canon Sale, D.D., Vicar of Sheffield, *Chairman.*
Mr. Edw. Birks, People's College.
Dr. Elam, Surrey-street.
Rev. James Moorhouse, B.A, Vicarage.
Rev. Edw. D. Ward, M.A., Head Master of the Collegiate School.
Mr. Thos. Rowbotham, People's College, *Secretary.*

ENGLISH ART IN FRANCE.

The following letter has been addressed to Mons. Theophile Silvestre:—

London, 15th February, 1859.

Sir,—We have received with great interest the kind invitation of H.E. the Minister of State and of the Household of the Emperor of the French, who has reserved a special room for our works at the Exhibition of the Fine Arts, which is to open on the 15th of April next in Paris. We are much gratified by this appeal of the French Government, and we hasten to answer it.

We would suggest that H.E. the Minister of State should instruct you to appoint in London a person who, in conjunction with us and with yourself, should be specially intrusted with the duty of receiving our works.

We have full confidence in the Director of the annual Exhibitions of French pictures in London, Mr. Ernest Gambart, and we should be glad to find H.E. the Minister of State showing his concurrence in our sentiments by appointing that gentleman to act with you.

We have the honour to be, Sir,
Your obedient Servants,

C. L. Eastlake, P.R.A.
W. Mulready, R.A.
C. R. Leslie, R.A.
E. Landseer, R.A.
David Roberts, R.A.
C. Stanfield, R.A.
Chas. Landseer, R.A.
Daniel Maclise, R.A.
W. P. Frith, R.A.
Samuel Cousins, R.A.
E. M. Ward, R.A.
W. Holman Hunt.
Thomas Creswick, R.A.
Fred. Tayler, P.W.C.S.
Thomas Landseer,
T. D. Harding,
Thomas Faed,
Charles G. Lewis,
John Phillip, A.R.A.
G. E. Hering.
Frank Stone, A.R.A.
W. H. Simmonds,
Fred. B. Pickersgill, R.A.
W. Hunt,
S. A. Hart, R.A.
Richard Ansdell,
Alfred Elmore, R.A.
Charles Oldham Barlow,
Augustus Egg, A.R.A.
Henry O'Neil,
Abraham Solomon, &c., &c.

TWELFTH ORDINARY MEETING.

Wednesday, Feb. 23, 1859.

The Twelfth Ordinary Meeting of the One Hundred and Fifth Session was held on Wednesday, the 23rd inst., Thomas Sopwith, Esq., F.R.S., Member of the Council, in the chair.

The following candidates were balloted for and duly elected members of the Society:—

Deacon, Henry
Errington, Rev. J. R.
Houghton, Frederick B.
Mackintosh, Robert James, M.A.
Neilson, William
Starr, Henry.

The Paper read was—

ON THE LIBRARY, BOOKS, AND BINDING, PARTICULARLY WITH REGARD TO THEIR RESTORATION AND PRESERVATION.

By John Leighton, F.S.A.

In any effort that tends to the careful preservation of the literary treasures contained in our museums and libraries, I am sure that I shall be cordially seconded by the Society of Arts: a society that—whilst it pushes forward, diving into the future—can well afford to pause and think kindly of the protection of those landmarks of the past yet remaining to us.

My observations will not now touch upon the value of individual rarities in either books or bindings, but rather be directed to the better order or good government of that sanctuary—the Library—the place in which is embalmed the holiest part of man's nature; the place to which the devotee of to-day may retire and commune with the master-minds of past ages—be it for consolation or amusement.

The library ought to be of good proportions—lofty, fire-proof, well aired, lighted, and warmed—being furnished with due regard to the protection and preservation of its contents. The room best suited for this purpose is one on the first-floor, or above a vaulted chamber, having but one external wall, with windows facing the north, imparting an even steady light, without the glare of sunshine or heat, which parches and fades the colours of bindings and other contents.

The library should be surrounded by shelves, and if lofty, also by a gallery, for convenience of access; though, on no account, should the cases approach the ceiling, where in most rooms the air is hot and vitiated; as this tends to destroy, or rather impoverish, leather and other materials. The best and oldest plan of decoration above shelves is by busts, portraits of worthies, or trophies, agreeable to the eye and mind.

Mottoes and quotations, either upon cornices or entablatures, are pleasing incentives to study:—as,

A · WISE · BOOK · IS · A · TRVE · FRIEND. ITS . AVTHOR · A · PVBLIC · BENEFACTOR.

BOOKS · TEACH · VS · TO · REFINE · OVR · PLEASVRES · WHEN · YOUNG · AND · TO · RECALL · THEM · WITH · SATISFACTION · WHEN · OLD.

A · LIBRARY · OF · TO-DAY · CONTAINS · THE · ESSENCE · OF · ALL · THAT · IS · WORTH · PRESERVING · OF · WHAT . HAS · BEEN.

BOOKS · ARE · THE · CHEAPEST · ENTERTAINMENT · AND · THE MOST · LASTING · PLEASVRES.

A · MAN · IS · BUT · WHAT · HE · KNOWETH.

BOOKS · ARE · KIND · FRIENDS. WE · BENEFIT · BY · THEIR · ADVICE · AND · THEY · EXACT · NO · CONFESSIONS.

L'VNIVERS · EST · GOVVERNE · PAR · LES · LIVRES.
VN · BON · LIVRE · EST · VN · BON · AMI.

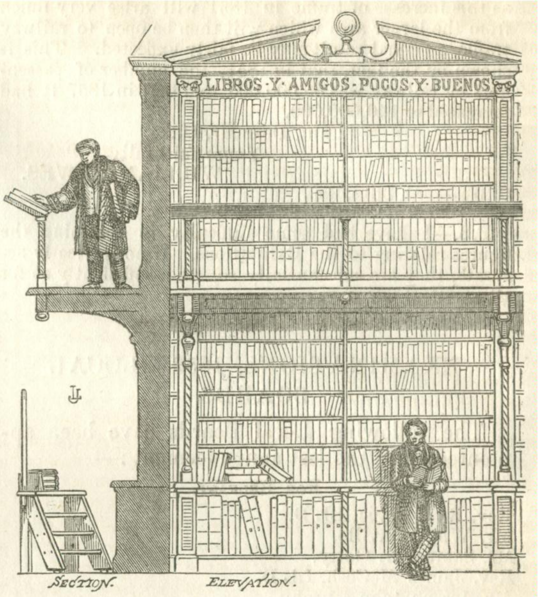
ANIMI · PABVLVM. ANIMI · MEDICINA.

VN · VOMO · LETTERATO · NE · VAL · DVE.
CHI · PIV · SA · E · PADRON · DEGLI · ALTRI.

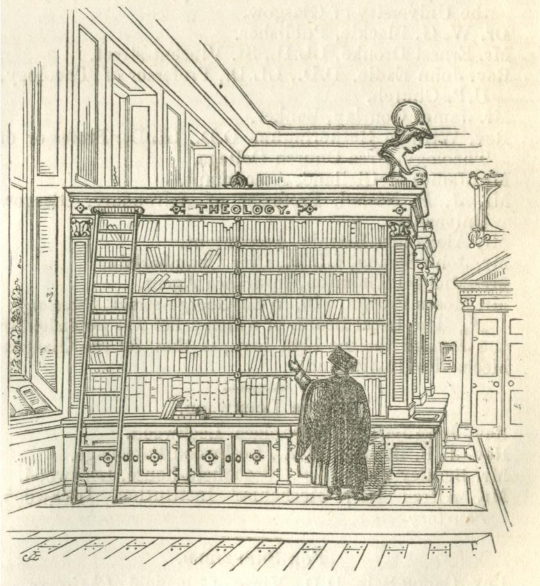
LA · VERDAD · ADALGAZA · PARO · NO · QVIEBRA.
CIENCIA · ES · PARA · POBRES · RIQVEZA, · PARA · RICOS . PRIMOR, · Y · PARA · VIEJOS · CONTENTAMIENTO.

NO · HAY · MAS · CIETRO · Y · DELEITOSO · AMIGO · QUE · EL · BVEN · LIBRO.

The lower or floor shelves of the library, next the ground, should contain folios and other large works—and may project rather more than eighteen inches into the apartment, affording a ledge, about the height of an ordinary sideboard, on which to rest with comfort such quarto and octavo volumes as are in use—the space above which, under the gallery, being appropriated to quartos and works of every-day use, which it is well to have within reach of the hand,* or at least from the dwarf steps (contrivances that should be light, strong, and easily moved about, having the wheels or castors under the step portion alone, to prevent accident). The upper or gallery shelves would hold octavos and smaller works—of less frequent reference than the lower cases—the gallery being sufficiently wide to permit two persons to pass—having a light ledge or over-hanging desk on which to rest the volumes—the floor being covered with felt, or some such substance to deaden the sound in walking thereon.



In great public or private libraries most convenient and commodious cases may be erected, abutting into the apartment from the piers of windows, as they do not obstruct the light or air, and afford pleasant bays in which to study in quiet: at the Bodleian Library these compartments have gates, forming snug reading rooms, from which the public are excluded. The library should be furnished with tables, covered with leather or cloth, having convenient drawers, also chairs—easy, without being luxurious,—portable desks and reading cushions for heavy books, with metal mountings or bindings, that



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* Shelves can easily be constructed within reach of the hand, about seven feet from the floor; though in the British Museum and some other new libraries they are more than that. If the steps are to be used at all, then it is judicious to have the cases nine or ten feet high (as in the engraved elevation). If possible the shelves in every part of the library ought to be of one width, that the books, when necessary, may be transposed *en masse.*

should never be introduced into the shelves with other volumes, as they would—by their protuberances—be like to injure them: they may be put in the drawers of library tables, with thick glass tops, and thus be seen, whilst the tables afford space on which to place things in general. To complete the furniture, a few presses with sliding trays (somewhat as a wardrobe) for folios of prints, an ample screen or two, and a light waggon for transporting volumes, will be useful.

In constructing book-cases it is always well to think of the growth of a library, its ever increasing population that must have lodgement, the time when increased accommodation must be obtained. In book-cases it is perhaps not well to have them in divisions of more than four feet wide, or deeper than royal quarto, on the upper tier: as small compartments are more compact, fewer volumes being disturbed when in use. "The Delphin Classics" is perhaps as long a set books as we may have to legislate for, and these would only occupy about five shelves: the rack-work at the sides, for elevation and depression, ought to be sunk within the cheeks—so as not to encroach upon the book space to their injury in sliding in and out; nor should the cheeks be so made that a volume may become hidden behind the pilasters or heavy framing, as is sometimes the case, for then volumes get out of sight and out of mind. It is well to have shelves covered with leather, being rounded at the edge to prevent sharp scraping angles, and also strong enough to bear the weight imposed upon them. Strips of wood are sometimes inserted at the back of shelves, forming ledges to receive the volumes, making them range evenly. Blocks somewhat resembling thick volumes, are useful for insertion, to prevent the books falling on the sides, as they are apt to do when a few are subtracted.* The great difficulty of definitely stating the height of the shelves in all libraries, comes of the variety of sizes of printed books, from the ponderous folio of our forefathers to the pocket diamond classic that so persecuted the eyes of our fathers.

The covering of books in the library from dust, light, and intrusion, is somewhat difficult; for whilst that old-fashioned protector, chequered wire, kept out idle hands, it afforded no defence against bleaching, dirt, or vermin; and, moreover, was unsightly, rendering the titles on the backs not easily read. The most economical method of partially defending books from dust, is by the affixing of small leather falls (some say cloth is the best) to come down over the heads of the books as they stand upon the shelves, and when the works fit their compartments this does pretty well, though a still better way is to have tammy or silken blinds, hung upon spring rollers, to draw down over the books during such periods as the library is not in use, or whilst cleaning.

The best covering for choice bindings is decidedly glass, as they may be perfectly seen and protected from all but the bleaching effect of light; smoke and soot, in the great metropolis, are more offensive, if not more destructive, than dirt in the country—where books suffer from parching and bleaching. To still further fortify against the insidious enemy, it is well to cover the tops of the volumes with stiff glazed card or millboard, from which the particles of dust can be removed, from time to time, with a cloth; the only thing against this plan is the various sizes of books; thus it will only serve for volumes of uniform size. Dirt is particularly apt to intrude between the sections of books that have not been cut with the folder, and is even perceptible after binding, here and there discolouring the top margin: gilt heads are decidedly the best protection from dust, as it can easily be removed from the precious metal by the application of a soft brush. The state of many a large collection of books is disgraceful from the apathy both of owner and librarian, who estimate little the importance of their trust (for the ownership of works of literature and art is but a trust, books and pictures being for all time), deputing the removal of literary treasures to upholsterers' agents, and their purification to the ruthless brush of the housemaid, who, if she does not beat the books together, like a pair of old slippers, will swing them by the boards, doubtless driving a portion of the enemy inwards. To prevent dust falling into volumes, I have heard of a proposition to place all books upside down upon the shelves, thus all dirt would fall away on the perusal of the work; of course this plan, if carried out, would necessitate the reversings of the letterings on the backs of the books. A gentle hand in using a book will do it good, whilst a rough one is sure to do it harm. The library requires similar attention to the greenhouse—light, air, and equal moisture, ought to be imparted to the leaves in either case—light without injury to colour, moisture without mildew, and air without soot. These things are as necessary to the librarian's, as to the gardener's charge. Whilst upon the subject of dust, I would advise that the library carpet be swept there as little as possible. The best covering for a library floor is a rich, but not bright, Turkey, that should in no case reach to the wall, but leave a margin round the room, on which the furniture may be placed whilst the carpet is removed entirely to be purified, a thing one would like to do with the chimney: great care should be taken in sweeping, and that smoke never be allowed to escape into the apartment.

The next important enemy to literature is damp—that great decomposer and discomposer of all things. Now, though a certain amount of humidity is necessary (as much as may be contained in a pleasant atmosphere), absolute damp is destruction. Rot! Damp, even from soft stone and ivy-covered walls, is very injurious—especially where book-cases are placed against such external walls—and more particularly in closed cases, as the damp then has no such opportunities of escape. A library should never be constructed upon the ground-floor for that reason; and it is better, as I before mentioned, to have your library enclosed upon three sides by offices or apartments; that is to say, upon such sides as the cases are placed, for paper is most susceptible of damp, particularly, as I am informed, when made with putrid size,* and emits a mouldy smell long before decay or mildew is perceptible; when it is, the best method to avert ruin is to have every volume opened (where affected), leaf by leaf, in a warm dry room, page after page being wiped with a clean cloth. I have known books much damaged thus spared, whilst others, though not obliterated, have become a mass of discoloured print and paper, so tender as to crumble by the touch. To render such paper again strong, resizing must be resorted to; if too tender for that, let every leaf be firmly pasted between two sheets of transparent paper, through which the print will appear, somewhat fainter perhaps, but still clearly enough; the only thing to be feared in this process is the paste becoming impoverished, in which case the leaves would be again set at liberty. A first folio edition of Shakspeare has been so treated in the British Museum. Some magnificent books of plates become spotted, as if by iron-mould, with but little damp, which seems attracted by the poor flimsy tissue paper in use some years ago, and issued with such works as "The Stafford Gallery," the "Musée Napoléon," &c. The wardens of cathedrals and colleges should carefully guard against damp, particularly if their buildings, appropriated as libraries, be adaptations of chapter-houses and cloisters. Good ventilation in some places is necessary on both sides of the cases. In the British Museum, though dry, all the glazed doors are left open one day in every week.

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* There is always a difficulty in bookshelves, namely, that the books fit them either too tightly or too loosely; if tightly the friction is great, if loosely the volumes are apt to become soft—dust and bookworms finding freer entrance. What is wanted here is some sort of wedge to press them up compactly together.

* In the manufacture of modern papers, many chemical preparations are now used to impart texture and colour, injurious to the fabric: thus, books are printed on whiter paper than of old, and also upon paper artificially toned as if by age.

Now, though damp is so injurious to paper, leather appears to resist it better than extreme dryness, a great enemy to bindings. Heat, and particularly heat from gas, so affects leather that it becomes impoverished. as was the case in the library of the Athenæum Club, where, some years since, the calf and Russia bindings suffered severely,—so severely that they crumbled under the touch, the backs falling away, the boards alone hanging by the slips or strings on which the book is sewn and by which it is held to the boards, all the oily matter seeming as if dried out of the leather—a fault common in Russia and some modern calf-skins, and perhaps capable of being averted by the introduction of glycerine or some such matter; at least, it would be worth experiment where leather is hard, rotten, or likely to fail; some composition to render it soft and pliable, without stain or injury, would be a desideratum. The varnishing or furbishing of old leather, alone, can add little to the strength of bindings, though it may somewhat tend to repel the action of the atmosphere, it will also tend to the hardening of the joints or parts where the greatest action takes place upon the opening of a book.

At the Athenæum Club Library, Mr. Faraday introduced a gas-burner, with a chimney for conveying the deleterious fumes therefrom to the outer air; a plan that I believe tended much to arrest decay. The best mode of illuminating a private library is by oil; for not only does it afford a rich mellow light, but it is also less likely than gas to tarnish gold or destroy brass work therein. Libraries in some cases are lighted from external parts, as the roof, and from without the windows; then the objections to gas vapours cease.

Having disposed of the effects of damp and heat—the two elements that are always at work, reducing the arts of man to their primitive state—there yet remains another—the book-worm :[*] I do not allude to the book-loving biped, but the book-devourer, that respects neither books, bindings, nor the shelves on which they are placed, eating its way through all—indeed, I have seen books so pierced, that they resembled a piece of lace or a child's puzzle-map. The book-worm is an insect not often seen even by those passing a life amidst volumes and well-acquainted with its ravages.[*] The damage done by this little animal is effected whilst in the larva state, after which, on arriving at perfection, it flies away, being the same species as that which bores into wood, and I have often noticed it in beech, particularly in the old presses and furniture of book-binders' workshops; thus, in the construction of library fittings, it would be well to avoid all woods grateful to the pest: I am informed that good solid oak is as little likely to be affected as any timber that can be adopted. In bookbindings there is but little doubt that old wooden and pasteboard covers are worm preserves, and as such, dangerous protectors, whilst modern mill-boards, made of well-tarred rope, from the nature of the materials will be more likely to resist attacks if not entirely to avert them. Russia leather was at one time considered an orthodox preventive, yet I have seen it pierced by insects, a thing rarer in vellum books and bindings. Dr. Dibdin has, I think, rather unfairly proscribed hogskin, as "grateful to the worm," though I have not found it to be more so than other coverings. The insect pierces the exterior to get at its food, and when in the boards or backs, is less likely to be disturbed; thus are those parts more freely attacked. In searching for worms it would be well to fill the holes in backs and boards with some composition destructive to animal life, in the form of a stiff paste, which could easily be done without injury to the books.

Of preventives, *corrosive sublimate*, and *colocynth* or bitter apple have often been mixed with paste by the binders, who have also washed leather and linings with solutions of them; but how successfully I know not, never having heard of anyone who noted results. Starch, alum, and *vitriol* (a remedy worse than the disease), have also been proposed, and *salts of ammonia* in the glair (or white of egg) for gilding.

Mites sometimes are engendered in the flour of which paste is composed, and I have known all the adhesive quality destroyed by these insects without touching the paper; to prevent this, alum—the ordinary substance introduced into paste by the binders—I think is good, as it is destructive of that saccharine matter apparently so grateful to these insects.

In tropical climates British bindings suffer much, all paste and glue seeming to lose its virtue there, while insects, much more numerous than here, dispose of the paper quickly. In China, I am informed, that there are few books older than the invention of printing in Europe, they having fallen a prey to the cockroaches; indeed, upon opening cases of Chinese books, at the British Museum, great is the slaughter of these and other insects, that if they escape, come but to die in our temperate climate. In China books rarely appear to be "*bound*," unless stitching can be so called, several *brochures* being contained in a lap-over case, open at the ends, on the paper of which the title is inscribed in native characters.

In India books and manuscripts suffer in the like manner, unless the leaves are impregnated with a preparation of *Orpiment*, which imparts a yellow colour to the paper; if chalk be added, then the tone is changed to blue.

In some Mahometan countries there are MSS. as old as the tenth century, but I think not upon paper.

In England, where books are used and light and air freely admitted, vermin [†] will not, I think, prevail; and it is the office of a good librarian to see that they should not: perhaps the periodical fumigation of a library with tobacco, or other substance, would be well.

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[*] The larva of *Aglossa pinguinalis* will establish itself upon the binding of a book, and spinning a robe, which it covers with its own excrement, will do it no little injury: as also does a minute beetle of the family of *Scolytidae* (*Hypothenemus eruditus*), which Mr. Westwood found burrowing in considerable numbers in the same situation. I have also often observed the caterpillar of another little moth, of which I have not ascertained the species, that takes its station in damp old books between the leaves, and there commits great ravages. The little wood-boring beetles (*Anobium pertinax* and *striatum*) also attack books, and will even bore through several volumes. M. Peignot mentions an instance where in a public library but little frequented, twenty-seven folio volumes were perforated in a straight line by the same insect (probably one of these species) in such a manner that, on passing a string through the perfectly round hole made by it, these twenty-seven volumes could be raised at once. The animals last mentioned also destroy prints and drawings, whether framed or preserved in a portefeuille, and even paintings: it appearing from a Parliamentary report on the state of the paintings in the National Gallery, and subsequent observations of M. Waagen, that the paste applied to the canvas of the fine picture of the Raising of Lazarus, by Sebastian del Piombo, has been so attacked by the larvæ of an insect (supposed to be *Anobium paniceum*) that its destruction is to be feared if some remedy cannot be found. The same insect has done considerable injury, as we learn from Mr. Holme, to the Arabic manuscripts in Cambridge Library, brought from Cairo by Burckhardt.—Kirby and Spence, "Introd. to Entomology" (small edit: p. 138). London: 1858. The book worm belongs to the family of the *Ptinidae*, corresponding with the Linnæan genus *Ptinus*, in the order of the *Coleoptera*.

[*] At the Bodleian Library, in hunting for book-worms the assistant was rewarded by the discovery of about one a day. These he found mostly in books of two centuries old—frequently in old foreign works.

[†] Damage done by rats and mice to books upon shelves is not frequent, as they do not eat paper, though they may gnaw through it in constructing passages and nests. I have known a mother and young mice *sold* in the Reports of Parliament as waste paper.

Having treated of the pathology of books, and prescribed the best known remedies, we will now touch upon costume, and other matters. In rebinding an old volume, it is well to make the new one a restoration, as not only do you thereby obtain a good style, but one that best suits its complexion; to put an old book in a fine new cover evinces want of taste; indeed, volumes should never be rebound unless in a dilapidated state and past repair. Then should the stained leaves be carefully soaked in hot water to remove foul marks, great caution being exercised in taking out ink-stains by the use of lime and acids that ruin paper though they make it appear fair; if the sheet be tender or over absorbent, afterwards dip in pure vellum size, which will, when dry, impart strength. If any of the leaves are torn, let them be carefully mended with paste, and if valuable, the printed portion be restored, as can be done from a more perfect copy; if not of much importance, the blank space may be left as evidence of the missing part, or even be written upon in fair script, with a common pen. Small plates and leaves can be inlaid into larger ones; thus may a duodecimo be made into a folio, with a grand margin for illustration and annotation. Whole plates and pages may be done in fac-simile by photography, or reproduced by the anastatic process, especially where the original is not too dry, dirty, or too valuable to be risked in the process; for sometimes the damp and pressure it is subjected to, is apt to injure the thing to be duplicated without realising a fair copy. Prints of two centuries old have been reproduced successfully by this means, though it is not always certain: for the literal reproduction of a magazine or newspaper article nothing can be better. Lithography is also excellent as a reproducing agent, by tracings from valuable originals, and especially so for autographs and letters.

Having touched upon most of the methods of restoring and repairing single leaves, I must not omit another process that has come to the aid of the bookbinder—the splitting of sheets of paper. To show how valuable this is at times, I will tell you how a rare old book was made complete, that otherwise could never have been made so, the fact being that the printer had turned his sheet the wrong way in perfecting the impression from his types—thus every page was backed by text due some pages in advance or arrear, and it was not until every leaf of that sheet was split, and each page united to its proper fellow, that the book could be called complete. Little did the printer of old, when he plied his press in Spain, centuries ago, think that his error would thus have been corrected here. The rare old book was on Painting, by Pacheco, the master and father-in-law of Velasquez, and is now in the possession of Mr. Stirling, of Keir; having been patched and completed from a duplicate copy in possession of the Earl Ellesmere.

Notes and annotations upon fly-leaves and margins, unless trivial, I think it good taste to preserve with care (pencil notes being fixed with milk or clear vellum size). I would also retain the book-plates* or arms of the former owners, which, in rebinding, can easily be removed and placed on the end board, to be handed down with the badge of its present possessor—hereafter to become matters of history. As to the boards of very old books—never destroy them until proved worthless, for sometimes they are made up of curious old deeds and documents, illuminations, old copper-engravings, and woodcuts—perhaps useless in their time, but certainly curious now.

It is well to direct the bookbinder to keep volumes entrusted to his care as much in their integrity as possible—never to tear away fly-leaves and half-titles, as is often done, for they are part of the book (and in some cases alone carry the imprint of the printer).

"Preserve and protect" ought to be conspicuously written in all libraries. How valuable would be some of our serials with all their advertisements*—*The Gentleman's Magazine*, for instance:—are there not there to be found notices that tell the history of publishing for above a century—the prospectuses of the early insurance offices for fire and life, the rise and fall of the lotteries, a reflection of Jacobitism, of Republicanism, and many other isms passed away? I do not say bind up with the *Quarterly*, or *Edinburgh*, such bundles of modern paper as are issued with them; though, should any complete set escape the binder's knife but for a century, they will, from their rarity, be more valuable than the work itself. In binding a work published in parts, it is well to order that one of the number covers be bound in at the end to show the method of publication, as not only does it often contain some device not to be found in the book, but also an author's proclamation or protestation not always fulfilled: for instance, suppose Lord Macaulay's New Zealander, on the ruins of the British Museum, examining a fragment of one of Mr. Dickens' green serial covers, so prophetic of the tale—would not that at once explain a style and method of novel writing either originated or lost in the nineteenth century.

In the bookbinder's hands maps and plates require great care, so as to be fairly, squarely, and properly placed in their respective positions—all inscriptions upon plates being made to read *up* the page. Books of plates should never be heavily pressed, as it is apt to injure the texture of the impressions; a print from an incised plate being ink in relief on the paper, and as such ought to stand upon it rather than be pressed therein. *Tissue paper*, as it is called, should be placed between impressions from engraved plates and letter-press, to prevent transfer—unless old, and even then it is pleasant to see the plate protected by thin highly glazed paper, to the full size of the page, yet thick enough to stand therein without creasing or protruding from the front of the volume. The old flimsy tissue paper, as I said before, was not only deleterious from its attracting damp, and thereby contracting stains, but is full of knots, and apt to fall into the back of the book, rather tending to injure than preserve; this should at once be removed.

As to maps, I would advise their being separate from the volumes, as they much interfere with the solidity of a book, when bound up with it, and are apt to tear away; to those who do not know how to use a volume, a map affixed thereto is an insuperable difficulty—to be folded and refolded in every direction until it becomes rumpled and destroyed. Large maps ought to be separately mounted on linen, and made to fit into pockets at the end of the volume; two or three fold maps may easily be retained therein, being mounted on a guard the full size of the page, and thus exposed beyond the volume for reference during reading.

In binding modern works great care should be taken to avoid "*set-off*" (or the transfer of ink from one page to another), a circumstance much more likely to occur now that books are pressed by the rolling-machine than when they were rendered solid by being beaten with the hammer on a stone. Books, also, or rather printed sheets, when fresh from the press, are apt to be much damaged by the action of the folding-knife—by having that instrument sharply drawn across the sheet, producing a glazed, bleared, diagonal line; this, with the indiscriminate side piercing of sheets (as in serials and pamphlets), injures the appearance of a book for ever, especially if a plate has to be turned in binding.

The binding of several books in one is much to be deprecated, unless in the case of riders, supplements or addendas, or when two or more volumes form an annual.

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* Book-plates, in old volumes, I am sorry to say, are not always to be trusted as evidences of ownership: booksellers sometimes soaking them off old boards to insert into other volumes and thus deceive collectors. Book-plates and labels ought to be of different sizes, the one for folio not suiting a duodecimo.

* In the British Museum, serials are bound entire, with their covers and advertisements, forming motley but interesting volumes.

The whole works of "*Voltaire*" have been crushed into one corpulent volume—a great feat, only to be admired for its difficulty—some amateurs, having fancies peculiar to themselves—loving thick books—as others, detesting margins, order their binders to cut books down to the print, and treat *margins* as mere waste paper. I have heard of a gentleman who, when he wanted a pipe-light, deliberately took down a volume from the shelves and robbed it of margin; and of another who, when he had read a book, threw it aside as useless; but happily these are rare exceptions, most proper minds respecting their instructors. To wantonly disfigure a good book with inappropriate stamps, is not only to mar the beautiful, but also to rob an after generation of a fair estate.

As to clothing, I think that I may say for book jackets "*there is nothing like leather*," though both vellum and calico are useful agents, and especially the latter, which, by the co-operation of London bookbinders and publishers, has reached a great pitch of excellence, particularly that known as "*cloth boarding;*" but of this department I shall say but little, design alone forming subject matter for a long paper. Leather seems the material *par excellence* for covering a book, as in no other material can so perfect a joint, or hinge, be made.

In flexible binding (where every sheet is firmly fixed to the cover), leather cannot be dispensed with; vellum and cloth only admitting of hollow backs, that is to say, where either material is to be decorated or appear neat. In the middle ages, I know that tight backs have been done, but always in combination with the heaviest workmanship and absence of finish; the lettering on the back being executed with a pen, whilst the wooden boards were left uncovered, and the fore-edge fastened by thongs.

In these books the sewing is very good, an important item in the strength of a volume, every sheet being sewn upon the cords or bands across the back. In the present day the bands are mostly hollow shams, having more to do with ornament than strength; the cords upon which the sheets are sewn being inserted into grooves made in the back by a saw—a neat way, but not so durable as the old method, particularly for heavy volumes.

Many books of the mediæval period are bound in vellum, and leather, without mill-boards. Formerly a pasteboard was used, made of the rudest materials—paper, cloth, old vellum, or what not; the earliest leather covers were principally of a rich brown calf, undyed, and so they remained until the early part of the present century; all the stains then in vogue being imparted to the skin by the bookbinder, who, by the judicious application of them, produced very beautiful natural effects—tree marbles, sponge dabs, sprinkled and spotted patterns, innumerable, though not always without injury to the leather, the surface of which the stronger acids were apt to burn after some years' action. The plain dyes given to calf in the whole skins, have tended to supersede the colouring of leather on the volume itself. The old, simple, *undyed calf* was exceeding good and strong, being more durable than many of the fancy-hued hides of the present day that seem to have the elements of decay therein before being put on the volume, and even afterwards are washed by the binder with oxalic acid, imparting a delicacy of surface most injurious to the skin. This is clearly evidenced in the binding of law books, uncoloured calf being always used (which, in combination with the white edges is, I believe. intended as typical of the purity of the profession), the leather being washed up with spirit to a fictitious whiteness, rendering it in a few years rotten, as many law libraries will sadly testify. Morocco, the earliest coloured old leather, is decidedly the strongest, richest, and best for the binders' art; it is a surface-dyed goat-skin, and no doubt first came to England on Venetian books, when that Republic was in its glory. It is the prince of leathers, having received the greatest and choicest amount of decoration, the most delicate and boldest of hand-tooling.

Hog-skin is a nice and durable material for bookbinding, though not much used; it takes blind-tooling admirably. Russia, unless used extremely thick, is a poor and rotten leather, if pared thin being little stronger than paper, and only to be prized on account of its odour and pleasant tone of colour. In bookbindings of the present day, leathers are pared and shaved much too thin, especially where strength is most required—at the joints, near the head-bands, a thing by no means necessary, if the leather be turned in the entire thickness, space being cut for its reception in the board—a plan I always have adopted for heavy books. Vellum is extremely strong and useful to the binder, though from its rigid nature hardly adapted to book-joints—at least as books are bound, or "*forwarded*," as it is termed, at present—unless it be those of account-books, where all strong materials, from hard writing-paper to horny bands of horny leather, are most prized. Vellum bookbinding for Banks, &c., is a distinct branch of trade, apart from bookbinding proper—that of printed books, on which it is somewhat difficult to get a whole vellum cover to set well, it being a material better suited to immovable parts, as edges, corners, linings, and inlayings.

Of fabrics, silk and velvet have been much used, though neither of them are susceptible of the highest branch of bookbinding, decoration by "*finishing*" as the gold-work is termed. Velvet, nevertheless, is extremely rich as a ground for gold or silver mountings, ivory, or carved wood; whilst, of all the fabrics that have ever been used in bookbinding, "cloth" has created the greatest revolution, and calico been made to appear every material save what it is—Morocco, Russia, moire antique, silk, marble-paper, &c.; but, for all that, it is a most valuable and durable material—a good substitute for paper, and the modern publisher's best friend. Thus many books in exquisite taste, more particularly on account of their impressed designs, take a prominent place upon the drawing-room table and the library shelves, to remain many years in their birthday suits, which a quarter of a century ago would have been worn out in as many months.

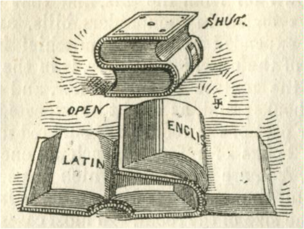
Colour, in bookbindings, is of great use if judiciously carried out, as an indication of subject: as dark brown, or purple for "divinity;" dull red, for "archæology" and "history;" green, for "botany;" red and blue, for "naval" and "military" subjects, with the usual pie-crust colour for the "law."

As to the "finishing," or quantity of gilding, that must be regulated by the taste and purse of the proprietor—have he his books in whole or half-binding; though in any and every case it is well to have the date and place of publication at the foot of the volume, on the back, as it will save much trouble, and the book wear and tear in and out of the shelves. In the British Museum some foreign books have the title and a translation put on the back also; whilst at the Bodleian, above the lettering they indicate its class, as "Novel," "Biography," "History," &c., as the case may be, appending the author's name if known.

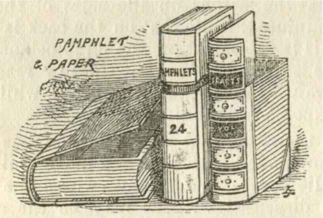
Regarding the colouring of the edges of volumes, red is perhaps the oldest pigment used, prior to gold and marbling (practices that are sometimes united on the same book), as also is picture painting or illumination, though simplicity is preferable, and gilt edges the best and most durable. For ease of research, Cyclopædias and Lexicons may be coloured in different hues upon the edges of the leaves, and lettered thereon, as we have applied to the "Post Office London Directory." *

*** This useful contrivance, as applied to *The Post Office London Directory*, was the joint production of myself and Messrs. J. and J. Leighton, the extra binders, of Brewer-street and is now so well carried out by Messrs. Leighton, Son, and Hodge, the large publishers' binders, of Shoe-lane.**

Dictionaries in two languages may be bound on the plan of "twin-binding"—the uniting of the two parts, back to foredge, in such a manner as to expose the page of English-Latin and Latin-English at the same moment.



In bookbinding there is no greater difficulty than a judicious disposition of pamphlets. In the best collections I know, these dirty specimens of vagrant literature are bound somewhat in chronological order, in clumsy, spongy volumes, with a babel of titles on the back—titles often in themselves curt and contracted scarcely implying the real purport of the performance. As no collection of pamphlets can ever aspire to be quite complete, and the acquisition of an unknown tract may overturn all order, I would never bind together, but reduce to system thus—a plan little more expensive than collective binding—having each work done separately in what is called "*limp*," in a stiff cloth cardboard cover, somewhat as a memorandum-book, with a paper label on the side to receive the title in MSS.: the colour of each little *brochure* indicating its subject. These, divided and subdivided, may be either kept between boards (bound together by India-rubber bands), or be contained in Solander cases* or boxes made somewhat to resemble a book. In the British Museum pamphlets are bound separately, in single volumes, in a slight cover.



In alluding to order and arrangement come ideas of catalogues, and that much-mooted subject, how to make one?—a question of great difficulty to solve, and so dependent on circumstances—be the library large or small, universal or special, private or public. On this question I should be loath to dictate, as most plans have some advantages; it is an open question, and one alone to be discussed upon a careful perusal of all the old and new forms extant. Without a catalogue no collection ought to be; it is the inventory and source of all order, every volume being marked in accordance therewith—not in vulgar scribble or by patchy labels, as is too often the case, but with neatness and precision.

Before taking leave of the library, a few remarks on sham doors may not be out of place,—those false contrivances that so delighted our forefathers, and without which at one time no library was thought complete, making the place a sort of man-trap in which to catch the unwary. Like all shams, dummy-doors are to be deprecated—unless, perhaps, it be in out of the way corners, as coverings for closets; and then the titles of the works selected ought at once to indicate the fictitious nature of the spot. In the collections of the Duke of Devonshire at Chatsworth, and the late Samuel Rogers, in London, these false backs were made the medium of much wit: instead of mock Miltons and spurious Shakspeares, tall Thompsons and short Spencers, fat Bacons and thin Longfellows, were to be found such books as "The Circle Squared," "Nebuchadnezzar on Grasses," "The Babylon Court Guide," "Sir C. Hatton on Dancing," "Canute on Tidal Waves," "Photographs of the Antients," &c.; these, with the titles of unwritten works of great authors, affording matter for thought.

With a few desultory remarks upon the handling of books I will conclude, being well assured, that if properly used, volumes are capable of enduring for many centuries; and that if torn rather than lifted from the shelves, wrenched open instead of being gently coaxed, made to hold botanical specimens, paper-knives, letters, and other property, they will always suffer. There are few things more injurious to a book than baking it over a fire, or leaving it open face downwards, on pretext of "keeping the place," or damping the thumb in perusal; if fairly handled and gently turned, by passing the fore-finger of the right-hand under every leaf, from the top of the page to the bottom, it will smile fairly upon many generations, giving the best of advice without exacting any confession.

DISCUSSION.

The following letter has been received by the Secretary from Dr. Letheby, who says:—

I am sorry that my engagements will not allow me to be present at the reading of Mr. Leighton's very interesting paper, on the Restoration and Preservation of Books, and their Bindings; but I gladly accede to your request, and send you some specimens of the injury done to leather coverings of books by the products of the combustion of coal gas.

It is not sufficiently well known by the public that gas contains a large amount of sulphur, in a form that is not readily discovered. This, by combustion, is converted into sulphurous acid, which by absorption of atmospheric oxygen, quickly becomes oil of vitriol, and it is hardly necessary to say, that wheresoever this corrosive acid fixes itself upon any textile fabric, it slowly, but surely, exerts its destructive power. The leather binding of books is, from its very porous nature, peculiarly apt to absorb the acid, and hence it is more seriously injured by it than other tissues.

The proportions of sulphur in coal gas are very variable, but the results of a large number of experiments seem to show that the average amount is about 20 grains in every 100 cubic feet of gas. This will produce about 50 grains of anhydrous sulphuric acid, or rather more than 61 grains of the strongest oil of vitriol of English commerce. In some instances the proportions are more than twice as great as these; but supposing that amount to be not above the average, it will be seen that a large quantity of corrosive vapour is produced by the combustion of gas; and if a library is lighted with only four burners, each consuming 5 cubic feet of gas per hour, there will be produced in the course of five hours, which is not a long evening, as much as 61 grains of vitriolic acid; a part of this may be got rid of by ventilation, but enough of it will still remain to produce the most serious mischief to the bindings of the books.

That this is not a chemical speculation, but a matter of fact, is shown by the specimens before you, and by the following accounts which I have extracted from my report on this subject to the Corporation of London.

"Through the kindness of the managers of the Athenæum Club House, I have had access to the various documents which they possess, on the subject of the injury done to the library of that Institution by the products of burnt gas; and I find that in the summer of 1842 a Committee was appointed to investigate this subject, and that the services of Professors Faraday and Brande, Mr. Aikin, Mr. Brown, and Dr. Prout, were enlisted. Without going into the detail of their investigation, which went to show that oil of vitriol was the great cause of the mischief, I will inform you of the result at which they arrived. Dr. Prout said that he had taken two equal portions of the water used in the house, and had exposed one of these for a fortnight to the air of the drawing-room of the establishment; by which means he found that it thereby acquired a striking increase of sulphuric acid, so that when it was evaporated nearly to dryness it distinctly reddened litmus paper, and showed the presence of free sulphuric acid. 'This,' said Dr. Prout, 'sufficiently explains the destruction of the books, nor will there be any improvement till the gas is either removed or its fumes conducted away by appropriate chimneys.' Mr. Faraday and Mr. Aikin agreed in this opinion; and the Committee resolved that, as from the above experiment it appeared that much of the injury suffered by the books in the library is owing to acid vapours evolved by the combustion of the gas, it is advisable that, for the preservation of the library, the gas should either be discontinued, or that some arrangement be adopted for carrying off the fumes by an improved system of ventilation. In the end the latter was adopted at the suggestion of Professor Faraday, and, although the mischief has been to a great extent abated, yet, I am informed by Sir Henry Ellis, that he thinks he sees a certain degree of injury still progressing. Through the kindness of Mr. Magrath, the Secretary of the Club, and Mr. Spencer Hall, the Librarian, I am enabled to show you numerous specimens of the covers of books which have been thus injured; and you will notice that wherever they have been exposed to the atmosphere containing the vapours of burnt gas, they are as rotten as tinder; indeed, it often happens that the covers give way in attempting to remove the book from its place on the shelf.

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* So called after Dr. Solander, the botanist.

"At the London Institution, in Moorfields, the books have suffered in a similar way; and Mr. Brayley, the librarian, tells me that the books situated in the upper part of the room suffer most. He noticed that the surface of the leather of the binding lost its smoothness, and eventually the whole was reduced to a brittle substance, composed of a scarcely coherent powder, which had a powerful acid taste; to this he adds, that evidence has been obtained from bookbinders, as well as booksellers, of the deleterious action of gas lights and gas stoves on the bindings of books. In consequence of this a ventilating apparatus has been put up in the library of the Institution.

"Mr. Spencer Hall informs me that almost the entire library of the Earl of Tyrconnel, at Kilpin, in Yorkshire, whose mansion is lighted with gas, has been destroyed in a similar way; and Mr. Brayley confirms this fact. The latter gentleman has also told me that mischief of a like description has occurred in the Portico Library at Manchester; and, from a statement made in a leading article of the *Times*, of the 14th of January, 1854, it appears that the books in one of the rooms of the *Times* Office, where gas is constantly burnt, shrivel up and break after two or three years exposure.

"Some time ago when I visited the library of the Royal College of Surgeons, in Lincoln's-inn-fields, I was surprised to see how much mischief had been done to the bindings of the books by the products of gas combustion. I should think that in the gallery of that Institution there are hundreds, if not thousands of books, the backs of which are completely rotten; and Mr. Stone, the late librarian, tells me that he has the most satisfactory proof of its being due to the action of gas, in the circumstance, that whenever a book has been taken out of the library for any length of time it is found to be preserved, although its fellow volumes are thoroughly rotted. I place before you a few examples of the injury done to the books of that establishment.

"Mr. Thornhill, the librarian of the Literary and Philosophical Society of Newcastle-upon-Tyne, has written to me to say that an enormous amount of mischief has been done to the books of that Institution. 'It may,' he says, 'be stated generally, that all the books which have been in the library for a few years have suffered more or less from exposure to the action of the matters thrown off from the gas, and that large sums have been expended in bookbinders bills, and will yet have to be expended before the mischief is repaired.' The nature of the mischief, he says, is in the entire destruction of the texture of the leather, and even of the ends of the books; and, as might be expected, the books in the upper part of the room have suffered most. 'In a room where books of reference, such an encyclopædias, dictionaries, &c., are kept, and which is used also as a reading room, the quantity of gas burnt is large in proportion to the size of the room. In most cases the leather on the backs of the books in this room has been frequently renewed, both in cases in which the books were frequently used, and in which they were not used at all; the backs, in fact, became loose as the books stood upon the shelves.'

"And now comes a very instructive observation which has been communicated to me by Mr. Thornhill. In the case of books missing from the library being recovered, the leather of the books so restored has been found perfectly good, whilst the leather on the books in the same binding has been utterly destroyed, although the books had been standing almost undisturbed (except for being dusted) on the shelves; one book was recovered after having been out of the library ever since the year 1818, it had in fact been replaced; it is bound in an inferior Russia which is perfectly sound and good. In a set of Dodsley's Annual Register, bound in the same leather, and purchased a few years ago in first rate condition, the leather could be easily brushed off by a hard brush.

"It might be thought that the mischief here alluded to arises from other causes than the combustion of gas, but the proofs of its action are so clear that it is not necessary to discuss this point; indeed, I have ascertained by actual analysis that the leather on the sides of the damaged books is uninjured, while that on the back is completely rotten: this is dependent on the circumstance that the atmosphere is excluded from the sides by reason of their pressure against the neighbouring books, whilst the back is freely exposed to its influence."

I think, therefore, that Mr. Leighton has very properly recommended that "the best mode of illuminating a private library is by oil;" and where the use of gas cannot be dispensed with, as may be the case in our public libraries, the products of combustion should always be carried away in the most complete manner from the atmosphere of the room.

Mr. SPENCER HALL, F.S.A., having expressed the gratification which the reading of the paper had afforded him, and the deep interest which he was sure must be felt by all present, in the preservation of public libraries, said he would follow up the remarks of Dr. Letheby, by placing before the meeting some of the results of the destruction that had occurred amongst the books of the library of the Athenæum Club. Whilst the inquiry was proceeding with respect to the destruction that was going on in the library, he was very much indebted to several practical bookbinders for the assistance they rendered him in helping to solve the difficulty, and for many valuable suggestions which they gave him. Amongst other things, it was stated, that the red dyed Russia leather was not to be depended upon for durability, in consequence of the materials used in its preparation, and it was suggested that if the pale Russia leather were used, the evil would probably be avoided. Mr. Spencer Hall then drew attention to three sets of volume of equal size, which had been all bound in Russia leather at the same time, and which had been deposited in different parts of the library. The binding of the volumes which had been kept under a glass case had alone been preserved, whilst the others had either become parched up and perished, or else had fallen into a condition of decay, the leather being reduced to dust, which emitted a most disagreeable odour. Upon the nature of that dust a good deal of speculation had existed. He thought it was very desirable that it should be ascertained what the exact composition of it was; he had been told that it contained muriatic acid. The employment of coloured calf binding was always more or less dangerous; but if one description was more so than another, it was the pale yellow calf, which had been referred to in the paper as the material chiefly used in the binding of legal books. He hoped this discussion would result in eliciting some valuable practical information on this interesting and important subject; and he trusted that this Society, which had already done so much for the objects which it promoted, would not let the question rest where it was. It was important to investigate the action which the various substances used in preparing the different descriptions of leather had upon its durability. Calf leather, as he had said, was unsatisfactory, and the result of his own experience was, that if the fancy-coloured skins were used in binding, a heavy bill for repairs would be the result. Looking back to the old folios bound in the Dutch calf, even under the adverse circumstances of the Athenæum library, it was found that the decay was merely a natural one from the long lapse of time; but modern work showed no such durability. He believed that the morocco leather was best adapted to withstand the effects of the combustion of gas, as well as of a heated atmosphere; and, as far as his own observation went, there was no binding so much to be relied upon, or so cheap in the end, as good morocco. With regard to the fitting up of libraries, if there was one thing he feared more than another, it was the constructing bookcases with undue attention to their architectural effect, which often involved the introduction of ornament likely to interfere with the convenient removal of the books from the shelves. He thought that shelves from three to four feet in length were a very good size, but this must depend on circumstances. In all public libraries there was one principle which ought never to be departed from—that was that every thing which was done should be done for the public convenience. All other matters should be subsidiary to that. The great point to be observed was a means of easy access to the books, without placing the visitors under the difficulty of having to climb ladders in order to reach them. Generally speaking he thought it a good plan to divide a library into stories, each about seven feet high, thus enabling the top books to be reached with ease. With regard to London, of which he spoke more especially, he considered one great point in connection with the preservation of the books, was to keep them within glass cases with moveable frames. Any one not accustomed to large libraries in London, would hardly credit the amount of dust and dirt that accumulated upon the books, which in damp weather became almost a pigment. With reference to the covering for the floors of libraries, he certainly was not in favour of Turkey carpets, as they held an intolerable amount of dust. In the British Museum the flooring was covered with kamptulicon, which possessed the advantage of being noiseless, and was easily swept and washed. He believed as yet no paper had been read before the Society upon the important subject—How to form a public library; and further, upon the best means of compiling the catalogues of large libraries. If the Society would take up those subjects, he was sure it would bring together a vast amount of information which was now scattered, and this would form an interesting event in the history of the literature of the country.

Mr. HARRISON (of the London Library) would join in expressing an earnest hope that the Society would be induced to take up the subjects to which Mr Spencer Hall had alluded, as well as the question of the effects of the combustion of gas upon the bindings of books, for he confessed, notwithstanding the examples before his eyes of the destruction, attributed to that cause, that had occurred in the Athenæum library, he had lately recommended the introduction of gas into the extensive library under his care, hoping to avoid the dangerous effects alluded to by the use of cannel coal gas, which was of much purer quality than ordinary gas. The gas in the library to which he referred would be lighted only for a short time even in the depth of winter, the lights being extinguished at 6 o'clock. He was in some degree led to make this recommendation from having seen that the shops of all the large booksellers in London were lighted with gas, where there were bindings of great value. From what he had heard that evening, he confessed some fears had been created in his mind, and he felt that they should have to look to the Society for guidance in this matter. He thought public libraries should be lighted from the top, and that the galleries should be of sufficient width to receive a reading table, as it was most inconvenient to go up several flights of steps to fetch a volume and then to have to go down again to read it. He suggested that perhaps a good means of defence against the action of gas would be to return to the use of vellum bindings. He had visited several foreign libraries. In Italy, Spain, or France, they might naturally expect to meet with libraries carefully kept; but one of the most remarkable was the Imperial Library at St. Petersburgh, which was of great value, although it boasted but little in the way of fine bindings. It might interest those who were concerned in the classification of books to see the shelves in that library, with folios, quartos, and other sizes all together on the same shelf, attention being paid rather to the classification of the subjects than to the size of the volumes; but of course, that plan could only be carried out where space was of no consideration. He had seen a private library, near Moscow, in which were some remarkable specimens of the old French binding. Books brought from France at the time of the revolution, with the Bourbon arms still on them, and the splendid red morocco bindings were to be seen side by side with charred volumes that had been partially destroyed in the great fire at Moscow. In cases where the library extended to two floors of a building, he would suggest that a sketch of the ground plans of the library rooms should be placed in the principal room, indicating the position of every case, and the general nature of its contents. He would add one word to what had been stated by Mr. Spencer Hall with regard to the arrangement of space in libraries. This was to him a subject of much interest, having a growing library under his care, where, as the books circulated, a mode was adopted which was not very common. The books were perhaps arranged in classes, each class being placed alphabetically on the shelves; when a book was removed from the shelf, the vacant space was filled up by the insertion of "returned books" into their places in the alphabet, so that by simply shifting the volumes according to the exigencies of the day, the space left by the absent books was always in use, and a saving thus made to the library equal to the three sides of a large room. Another point alluded to by Mr. Leighton, was the mode of placing books on the shelves so that the dust would fall off them when taken down. He thought something might be made of that idea. It was mere habit to take down a book and open it laterally, but to make the plan effective, they would have to teach the world of readers how to open their books; or to the mischiefs arising from the present system would be added the disappointment of having a volume open the wrong way up.

Mr. G. F. WILSON, F.R.S., said Mr. Spencer Hall had asked for suggestions from members of the Society, with regard to the action of the products of combustion of gas upon the bindings of books, and, as one had occurred to him, he would mention it. Mr. Spencer Hall had stated that the leather he had found to be least injuriously affected was the morocco. Now, he believed, more oil was used in the preparation of morocco leather than in any of the other descriptions employed in bookbinding; and it was to be presumed that this would have the effect of protecting the leather from the action of the sulphurous or sulphuric acid. But he believed the oil itself in the leather was by long keeping affected by the action of the oxygen of the air, and he thought it would be worth while for some manufacturer connected with leather-making for book-binding to try the effect of some of the hydro-carbons, which were known not to have affinity for oxygen. There were many such oils now known. The oil of coal was produced now almost without smell; and there was also the oil from schist, or from petroleum, none of which were acted upon by the air, and he thought they would be worth attention.

Mr. Hyde Clarke said there was one point mentioned by Mr. Spencer Hall that deserved serious attention. That was with regard to experiments upon the different substances used in the preparation of leather for bookbinding purposes. Mr. Leighton, as an artist, would no doubt remember the important experiments made by Sir Joshua Reynolds upon paints, and the record which he kept of every work he painted, from which a sound inference might be drawn of the value of any particular application. He had been much struck with the practical character of the observations of Mr. Leighton upon the art of bookbinding, and this had impressed upon his mind more strongly a subject which he was about to bring before the attention of the Society. In the proceedings of this Society there were many valuable papers on various trades and processes of manufacture; and perhaps there was to be found in the pages of the *Journal* information on particular subjects not elsewhere to be had; and he could not but think that if these papers were selected, classified, and re-published in a condensed form, they would constitute a work invaluable to the manufacturers and working classes of the country.

Mr. Atkins said in the discussion of the question of injury to libraries, it would be desirable to know how the library of the Athenæum was heated, and also whether gas was indispensable in large libraries. He thought the heat of the room, independently of the gas, had something to do with the injury to the bindings. He also thought that all receptacles for books ought to be periodically opened, to admit of the free circulation of air through them, and prevent the accumulation of damp.

Mr. Spencer Hall admitted that whilst the products of gas burnt in a library had a detrimental effect upon the bindings, yet that was by no means the only enemy of books. There was no prejudice against the use of gas, but the feeling generally was in favour of that mode of lighting, as it was undoubtedly the easiest and the cleanest, as well as the cheapest method. They must not assume therefore, that gas was the sole cause of the injury to the library, although no doubt, in the case of the Athenæum, it formed an important element in the matter. The general temperature of the upper part of the room was about 60 degrees, which he was informed was not destructive to leather. There could be no doubt that deleterious matters were introduced in the process of tanning the leather, as also in the process of binding, an instance of which was the application of oxalic acid to the leather used in the binding of legal books. The rooms of the Athenæum were lighted up in winter from about half past four in the afternoon until one o'clock a.m., which, together with the fires, kept up a large amount of continuous dry heat. At other club houses the books in the library had been destroyed in a similar manner where no gas was burnt, and where the dry heat alone was supposed to have occasioned the mischief. Mr. Aikin's opinion was sufficiently clear upon that point. With regard to what had fallen from Mr. Harrison upon the subject of vellum bindings, no doubt this material was very satisfactory, and, for a time, books so bound looked very well; but after they had been upon the shelves of a library in London for some time they became very discoloured and dirty. In other respects no doubt vellum was a very excellent binding.

Mr. Wheatley remarked that the deleterious effects of gas in libraries were probably enhanced from the fact that a larger quantity of light was given than would be the case with other modes of lighting, and consequently more heat. He had seen libraries in which oil lamps alone were burnt, and in others wax candles, and in both cases he had found effects as destructive to the books as those which had been attributed solely to gas. In the Alfred Club the books were in a very bad state; the covers fell away from the backs in the same way as was described to have occurred at the Athenæum, and he thought more investigation than had yet been given was necessary before they could throw the whole blame of the mischief upon the gas. With regard to the arrangement of small libraries, he thought the best way was to enumerate the cases by letters of the alphabet, and the shelves by numbers; but that could hardly be done in a large library without causing confusion. In one of the clubs the shelves had been numbered consecutively from 1 to 400, which he need not say had been found most inconvenient. In public libraries he thought there should be an ante-room in which the serial publications should be deposited, which would prevent disturbance of the other arrangements of the establishment. Upon the subject of glass-cases he slightly disagreed with Mr. Leighton, because in country houses the library generally remained closed for half the year; and upon the return of the family huge fires were lighted to air the house, and the effect was that, if the cases were not opened at such times, the books would mildew owing to the accumulation of damp. Mr. Wheatley added some humourous suggestions for the titles of imitative books in dummy doors, introduced for decorative purposes.

Mr. John Bethell said there was one matter in connection with the subject of the destruction of bindings which he thought had not been sufficiently noticed—that was the material that was used in cementing the covers of the books—namely, the paste. They had been told that evening that whenever books were subjected to a temperature most favourable to putrefactive fermentation—or about 70 degrees—whether gas, oil, or candles were burnt—the bindings of the books decayed. It was also stated, that books kept in a closed case, without proper ventilation, upon the introduction of an increased amount of heat into the apartment, were subject to putrefactive fermentation and decay. If they took some of the substances used in bookbinding—such, for instance, as the paste—and put it into the book-cases, they would find that it would very quickly show symptoms of mould and decay. And he would suggest it as a matter worthy of the consideration of bookbinders to adopt some description of cement which was not so liable to putrefactive fermentation as paste was—such as a solution of india-rubber or gutta-percha. He thought gas had been rather libelled in this matter of the destruction of bindings, for they were now told, that in libraries where heat was kept up, but in which no gas was burnt, the books were equally destroyed. The great evil appeared to be the high temperature that was kept up in the rooms, which was not only prejudicial to the books, but also to the readers.

Mr. John Rutley mentioned that for the preservation of pictures a mastic varnish was used, which was not affected by the combustion of gas; and which was readily cleaned with a piece of linen cloth. In rooms lighted with gas, deterioration was manifested very soon after the pictures were hung up, which was not the case in rooms lighted with oil or wax candles, no matter how high the temperature was.

Mr. Bone mentioned that he had found the "india rubber solution" to be a very excellent thing to extract oil or grease stains from books, whether bound in leather, silk, or cloth. It might also be used for removing similar stains from the insides of the books, as well as from furniture covers, carpets, rugs, &c. The process was very simple, and consisted in laying on a coat of the solution, and leaving it to dry ; it should then be removed with a piece of ordinary india rubber. It was also very convenient for fixing prints in a scrap book, being superior to paste or gum, as it was sufficiently adhesive to firmly hold them, while they might also be easily removed at any time without damage to either scrap book or drawing, as the india rubber could be detached in the manner he had described.

Mr. Wilson had found great saving in the wear of the edges of the books in taking them from and replacing them upon the shelves by letting in a piece of india rubber at the front of the shelves, thus preventing abrasion of the edges of the books.

Mr. Leighton said that time would not permit him to enter upon a reply to the various matters brought forward in the course of the discussion, but he would take that opportunity of tendering his thanks to the numerous gentlemen who had favoured him with the various interesting specimens then exhibited to the meeting.

The Chairman said, on rising to prepare the usual vote of thanks to the author of the paper, he was quite sure that they would join with him in considering the subject one of great importance and of universal interest; because there was no person in the room—young or old—who was not more or less interested in books, and in their preservation; and now that books were being so rapidly multiplied, it became of the greater importance that everyone should be well acquainted with the best means of preserving them. It was almost impossible in the present day to avoid forming a library of some kind, owing to the great cheapness and excellence of the works now published, and which were brought within the means of all. With regard to the arrangement of a library, he had always admired the plan adopted at the Institution of Civil Engineers, for books in a large number of volumes. It consisted in having a small round label on the back of each, so placed that, when the volumes were in their right order, these labels formed a diagonal line, and thus if one volume was out of its place, this was at once seen. He thought the plan of preserving papers and documents by placing them between sheets of transparent paper a very valuable one. The subject had occupied his attention some time since, and he had made the suggestion to one of the secretaries of the Treasury, as an excellent means of preserving the writing upon copies taken by Wedgwood's manifold writer, as the writing, which was composed of carbon, would be thus effectually protected. As a material for bookcases, Mr. Leighton had spoken of the value of oak; and he (the Chairman) would mention that a Canadian wood called butter-nut had been recommended by Sir Walter Trevelyan as an admirable wood for cases for books, botanical specimens, &c. He had used it himself, and had never seen an instance of its being attacked by the worm. Mr. Leighton had alluded to the method adopted of placing the plates and maps of works in such a position as not to be readily compared with the text. A plan was formerly adopted in this respect, which he should be glad to to see again in use, namely, bringing the plates or maps when open, beyond the edge of the back. This remark was particularly applicable to large books like Johnston's Physical Atlas. It was a great drawback upon the value of that work that the contents were printed in the same volume with large and elaborate maps, and the difficulty of reference was very great. He thought, in expensive works, this was a matter deserving the attention of publishers. The subject of injury to libraries by gas was too important to be cursorily glanced at, and, therefore, at that hour of the evening he would not enter upon it, but they could not fail to be interested by the remarks of the gentlemen who had touched on that question. He had recently seen an announcement of an improved gas-burner, which might perhaps be found to mitigate the evil in some degree. In the country districts he had found that in libraries for working men the most durable binding was strong canvass. The books were used as long as they could be in the dress in which the publisher issued them, and were then bound with strong canvass, which was found to answer well. He would now make a proposition, which he was sure would be well received by them all, namely, the thanks of the meeting to Mr. Leighton, for the paper he had read.

A vote of thanks was then passed to Mr. Leighton.

The paper was illustrated by a large collection of books, showing various styles of ancient and modern binding, as well as the different modes of restoration and preservation described. Specimens of binding materials, skins, cloths, &c., were also exhibited, as well as instances of the destruction of library books, contributed by Dr. Letheby, Mr. Spencer Hall, and others, to whom the thanks of the Society are due, as well as to Sir Charles Price, Bart.; Mr. Robert Turner; Mr. William Stirling, M.P.; Mr. Bedford; Messrs. J. and J. Leighton; Messrs. Leighton and Hodge, and many other gentlemen; also to Mr. Ladd, who lent some microscopes for the purpose of showing specimens of the insect known as the "book-worm."

The Secretary announced that the paper for Wednesday Evening next, would be "On the Colouring of Sculpture," by Professor Westmacott, R.A.

The following letter has been received by the Secretary since the meeting:—

Sir,—It ought to be a leading point in arranging a public library to make the arrangement of the books on the shelves as nearly as possible a reflex of the alphabetic arrangement of the catalogue. There should be but one alphabet. The usual size of books, 8vo. and 12mo., may all range together, and that will be the bulk of the library, from ceiling to the floor—depth of shelf about 10 inches. I would have no small shelves at top, and large ones below; that causes confusion in the alphabet. The plan I follow is to make a separate division of shelves for 18mos. and 24mos., and also for 4tos. and folios, and then the librarian knows where to go for them at once, instead of poking about in shelves here and there. As to cataloguing, all books whatsoever should be arranged under the names of the authors. That is the only workable plan. The only books to be entered under their titles are those which are anonymous. But besides this arrangement in alphabetic order, there ought to be heads according to subjects, as Agriculture, Angling, Theology, History, &c. Under each of these heads, which are put in small capitals, may be entered brief references to works in the alphabet. For example:—

History of England and Scotland.

Macaulay—England.
Strickland—English Queens.
,, —Scottish Queens.
Hume—England.
Smollett—England.
Tytler—Scotland.
Laing—Scotland.

Such entries will at once direct attention to the special author and book wanted. I would refer to the catalogue of the Edinburgh Philosophical Institution for a perfect model in this respect, as well as in some other features.

I am, &c., ROBERT CHAMBERS.

Edinburgh.

Home Correspondence.

EVENING CLASSES IN MECHANICS' INSTITUTIONS AND GOVERNMENT AID.

Sir,—The meeting on Mr. Chester's paper was one of the most valuable of the session. I regret there was not time for the representatives of the Institution to take part in the discussion. The further consideration of the subject must now be reserved for the opinion of the conference in June. Westminster is the only metropolitan parish sufficiently enlightened to appreciate the value of Mr. Ewart's Free Library Bill. This Bill has been rejected by the City of London and the parishes of Marylebone, St. Pancras, Southwark, Islington, and Camberwell. It is a very difficult thing to overcome the inertia of parochial ignorance, and call people together to inflict a direct tax on themselves. Parishes reject the Free Library Bill because the tax is direct; if it were paid on receipt stamps or tobacco, or by any indirect means, almost every town in the kingdom would have had a Free Library. People resist direct taxation; and for the present whatever is done for education must be done indirectly. One difficulty attending Mr. Ewart's Bill is that a simple majority is not sufficient as in other local imposts, but there must be the assent of two-thirds of the ratepayers before the Bill can become operative. It is no use telling the infuriated ratepayers at a vestry meeting that the tax can never exceed one penny in the pound; it is enough for them to know that it can be a farthing.

The most important point raised in Mr. Chester's paper is the subject not of Government interference, as some spitefully call it, but of Government co-operation and assistance. Mechanics' Institutions, Working Men's Classes, and such like societies, are not the organization of any sect or party; and this constitutes their strength and their weakness.

For a long time Mechanics' Institutes were merely places of innocent recreation and amusement, with the useful addition of a library and news rooms. During the past three or four years the educational element has been very much developed,* and a large number of institutions now have classes for systematic instruction; this improvement is mainly owing to the Examinations of the Society of Arts. Now the amusements of the people will always pay and take care of themselves, but it is not so with the educational department of an institution; and experience leads me to the conviction, that as places of education, Mechanics' Institutions never can (except in a few rare cases) be self-supporting. I have taught in evening classes for years, and I have endeavoured to make myself acquainted with all the difficulties and drawbacks connected with them.

To talk about Mechanics' Institutions, as places of education, being independent, and repudiating all aid from the Government, sounds very magnanimous to people who profess to do everything for themselves, and I only wish it worked as easily as it sounds. You are to rely on voluntary efforts to meet all requirements; you may take any amount as charity from a private individual, but you must avoid, as a pestilence, any thing given by the Government. If you cannot afford to pay teachers, have voluntary teachers; they answer remarkably well in a Sunday School. If you cannot squeeze enough out of the poor lads who attend the classes to pay for gas, fire, and apparatus, get into debt. Go on in this manner as long as you can, break up, and then declare that these institutions are failures, and that the working classes care nothing about education. Now it would have been just as reasonable for the people of Westminster to have thrown themselves on the mercy of this voluntary spirit, instead of getting the force of an Act of Parliament to establish a Free Library.

The only difference between assistance from the Government and help from the local rates is this, the one is direct and hated, the other is indirect and not felt. In both cases the voluntary principle is repudiated. Those things which are for the general and public good, no one feels a direct and individual interest in promoting; all our national and many of our social reforms have to be enforced by the authority of law. It would be just as reasonable to throw the support of the poor on voluntary benevolence, as to expect a useful education for the children of the working-classes and the young men in our workshops, unless stimulated and encouraged by some certain source of aid dependent upon conditions clearly defined and easily carried out.

The most fervent hater of centralization and Government aid must admit that since the Minutes of Council, the elementary education of the country has greatly improved, and the professional ability of the teacher has been raised. But the universal complaint is, that the stern necessities of life compel parents to remove their children from school at a very early age. To remedy in some degree this sad misfortune, several plans have been suggested, but the most probable, and the one most likely to be received in good faith by the working classes, is that which encourages young men to continue their education in the Mechanics' Institution after they have left the Day-school. And if it be right in the Government to help the education of a boy while he remains at the Elementary-school, I see no good reason why that help should be withdrawn just at a time when the boy most needs it. Had he remained at school it would have been cheerfully continued.

Three years ago I published a plan by which I thought the Government might assist the education in Mechanics' Institutions in such a way as not to interfere with local authority. Let the Educational Department of the Government issue a schedule of such subjects as may be fairly aided by the State, and wherever 100 persons could be found prepared to undergo examination in any of these subjects, the authorities should send some person to superintend the examination, who should be responsible for its fairness and impartiality. I lay great stress on this, because I think such a duty, except in the direst emergency, ought never to be delegated to any local and comparatively irresponsible authority. Certificates of three grades should be awarded to successful candidates, with a medal or reward of books, according to the certificate or certificates obtained by the candidate. These rewards might be increased by local subscriptions; these and other collateral benefits might be held out as an encouragement to the pupils.

The teacher, in consideration of the number of pupils who passed an examination in the subjects taught by him, should receive a small capitation fee, in addition to a liberal share of the fees. The only conditions I would impose upon the pupil are that he had left the day-school, was engaged in some industrial occupation, was a member of some Mechanics' or analogous Institution, and had attended either at the evening school or Mechanics' Institution fifty hours instruction during the year in each of those subjects in which he proposed to be examined. By such a system the duty of the Government would be simply to test and reward results without what is called interference.

In a few years, I believe, we should be able to point to a national improvement more marked than any corresponding period in elementary education. The working classes would rise to a more intelligent appreciation of their moral and political duties. Their social condition would improve with an improved education, and this would more than repay the expenditure of such a system of aid as that I have indicated. After the first year I think there would be little difficulty as regards teachers.

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* Upwards of 5,000 young persons in Yorkshire are in regular attendance at evening classes connected with Mechanics' Institutions.

After the first examination of the Society of Arts, I took one of the pupils who had passed a good examination and made him an assistant teacher; in a short time he became quite competent to take the entire charge of the class. Such teachers may be raised up everywhere. You only want a guarantee that the teacher understands his subject and has fair teaching power. The best teachers will be found to be those taken from the class in which they have been taught. In the day-time my assistant worked in a shop with the apprentices and young men; he was engaged in teaching in the evening, and this is the true democratic principle of education, and ought to be encouraged. My assistant, so his employer informed me, was an excellent, steady workman; and, notwithstanding his superior attainments, he manifested no discontent, nor had he any desire to be a place-hunter, but as soon as he saw an opportunity to better himself he did what everyone does, availed himself of it; and he now writes from New York to say that he owes his advancement mainly to the evening classes at the Polytechnic, and forwards a small subscription to assist in carrying them on, which, as a matter of principle, has been returned. Unless the Government is prepared to offer some assistance, I fear this session will be the last of the Polytechnic Evening Classes. We have tried high fees and low fees. Our classes are not self-supporting, but, as regards numbers, they are very successful, and our pupils have done well at examinations. We have no sectarian zeal to urge in our behalf; we have no pulpits at our service; and to write hypocritical and pathetic begging-letters, or go from door to door with a charity-box, to be snubbed at one house, and insulted at another, is a humiliation to which we are not yet reduced. I would rather work for nothing than do this, because I think the principle a bad one. Old Snooks, the miser, escapes untouched, while the benevolent are too often taxed to a very shameful extent. The houses of the charitable are visited with all the regularity and confidence of the official tax-gatherer, while the houses of the stingy and niggardly escape without a visit. What we want is not this precarious and uncertain means of support, but a system which shall consolidate the Mechanics' Institutions and lay down a permanent system by which their educational character can be strengthened and developed. To help those who are desirous of helping themselves is the sound policy of this country in regard to national education.

I am, &c.,
J. C. BUCKMASTER.

St. John's Hill, Wandsworth, Feb. 22nd, 1859.

ELECTRO-PLATING ENGRAVED COPPER-PLATES.

SIR,—It is a tolerably well-known fact among those conversant with electro-metallurgy as applied to printing purposes, that engraved copper-plates have, since many years, been coated with silver and gold, for the purpose of protecting the plates from wear while being printed. In a letter from M. Joubert, in your number for the 11th inst., it is stated by that gentleman that the process of covering engraved copper-plates with zinc (as described by me) is an imitation of his process of covering similar plates with iron. Might I not, in equal fairness, challenge M. Joubert's process to be also, in the same sense, a copied idea? Assuredly; but to do so would be neither fair nor liberal.

The fact is that in this, as in most matters of a similar kind, adaptation is mistaken for invention. M. Joubert has undoubtedly by his *acquired* process greatly improved the practical means of a system already sufficiently well-known to *practical men*; but I conceive that it is as great a mistake to ascribe to M. Joubert or to M. Henri Garnier, of Paris, the full honour of an original invention, as it is for M. Joubert to call my zinc process an imitation of his *Acierage*, which it is not.

Besides gold and silver, zinc and iron are not the only metals which can be used for coating engraved plates. Nickel and palladium furnish beautifully polished deposits, capable of printing a greater number of impressions than I have given for zinc; while platinum, harder than either, can now be deposited in a *bright* state, and gives, as also in the case of nickel and palladium, a finer and (to use a technical term) *kinder* printing surface than any other metal. For this reason, either of the three may be advantageously used in preference to iron or other metals for the finest art-engraved copper-plates; and I state this especially in anticipation of the practicability of producing daguerreotype plates for printing purposes.

With reference to the question of cost, experience has proved that nickel and platinum may be deposited at the rate of less than one penny, and palladium twopence, per square inch. If ordinary care is observed in the preparation of the solutions, and in the manipulation, little trouble is necessary to verify these statements.

With regard to M. Joubert's comparison of the respective merits of the two modes,—that of iron facing with that of zinc facing, which latter I communicated,—I can only say, in conclusion, that for all practical purposes zinc facing, producible at an insignificant cost, and yielding 2,000 impressions from each coating, cannot be regarded otherwise than an important addition to the application of electro-metallurgy to printing purposes.

I am, &c., HENRY BRADBURY.

Whitefriars.

MEETINGS FOR THE ENSUING WEEK.

MON. ......London Inst., 7. Rev. Henry Christmas, "On Shakspeare's Historical Dramas."
Actuaries, 7.
Medical, 8.
Geographical, 8½.
TUES. ......Royal Inst. 3. Professor Owen, "On Fossil Mammals."
Civil Engineers, 8. Mr. R. Mallet, "On the Coefficients of Elasticity and of Rupture in Wrought Iron, in relation to the Volume of the Metallic Mass, its Metallurgic Treatment, and the Axial Direction of its Constituent Crystals."
Photographic, 8.
Medical and Chirurg., 8.
WED. ......London Inst., 3. Mr. P. W. Brayley, "On Meteorology."
Society of Arts, 8. Professor Westmacott, R.A., "On Colouring Sculpture."
Pathological, 8.
Pharmaceutical, 8.
Royal Soc. Literature, 8½.
THURS. ...Royal Inst., 3. Prof. Tyndall, "On the Force of Gravity."
Zoological, 3.
Royal Soc. Club, 6.
London Inst., 7. Mr. George Scharf, jun., "On Early Christian Art, as Exhibited in the Catacombs and Churches of Italy."
Antiquaries, 8.
Linnæan, 8. I. Mr. Baxter, "On the Vegetation of the Niger." II. M. Bourgeau, "On the Climate and Vegetation of Saskotchewan." III. Mr. Masters, "On a Monstrous Form of the Wild Carrot." IV. Mr. Spence, "On Five New Plants from Eastern Peru."
Chemical, 8½. I. Dr. Guthrie, "On some Derivatives of the Olefines." II. Dr. Medlock, "On the Action of Water upon Lead."
Artists and Amateurs, 8.
Royal, 8½.
FRI..........United Service Inst., 3. Admiral Fitzroy, "On Meteorology."
Archæological Inst., 4.
Royal Inst., 9. Prof. Tyndall, "On the Veined Structure of Glaciers."
SAT. ......Asiatic, 2.
London Inst., 3. Mr. Thomas A. Malone, "On the Metallic Elements, and their Principal Salts and Alloys."
Royal Inst., 3. Dr. W. A. Miller, "On Organic Chemistry."

PATENT LAW AMENDMENT ACT.

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APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, February* 18, 1859.]

Dated 1st *January*, 1859.

14. M. Wigzell, Friar's Green, Exeter—An improved form of nail or driving article.

Dated 5th January, 1859.

42. W. Corfield, jun., Charlton-Adam, Somerset—Imp. in chains for coupling, cranes, cables, mining purposes, hoisting, and all other purposes where chains are used.

Dated 8th January, 1859.

66. W. Delany, Chicago, U.S.—Imp. in submarine boats or vessels, and in apparatus used for working under water. (A com.)
70. W. E. Newton, 66, Chancery-lane—Imp. in steam engines and steam generators. (A com.)

Dated 19th January, 1859.

169. W. Clark, 53, Chancery-lane—Certain imp. in boots and shoes, and in the machinery, apparatus, and means employed in such manufacture. (A com.)

Dated 21st January, 1859.

196. W. H. Morrison and H. Kinsey, Nottingham—Imp. in means or apparatus employed in the manufacture of bonnet-fronts, ruches, ribbon trimmings, and other goffered or pleated articles.

Dated 31st January, 1859.

273. D. Bentley, Accrington, Lancashire—Imp. in self-acting apparatus, applicable to letter-press printing-machines, for supplying and removing the paper.
275. T. Wilson, Birmingham—Imp. in breech-loading and other fire-arms.
277. H. J. Newcome, Shenley, Hertfordshire—An improved apparatus for heating or warming buildings.
279. A. V. Newton, 66, Chancery-lane—An improved method of extracting gold and silver from their ores. (A com.)

Dated 1st February, 1859.

281. L. Rigolier, Lyon Place Grolier No. 5, Rhone, France—A new brake for railway carriages.
283. S. B. Eveleigh, Salford—An improved form or construction of hats or covering for the head.
285. S. Plimsoll, 32, Hatton Garden—Mining apparatus for use in mining coal and other minerals, and also for separating the small coal and crushed ores from the shale, dirt and other matters with which it may be in combination, and for drying the same.
287. R. Gormully, 13, Grafton-street, Fitzroy-square—Imp. of pianofortes with upright frames:
289. R. A. Brooman, 166, Fleet-street—Imp. in sewing machines. (A com.)
291. M. Loam, Treskerby-house, Truro, Cornwall—Imp. in machinery for raising sewage and other waters and matters.
293. M. Henry, 84, Fleet-street—The manufacture and useful applications of certain bituminous products and compounds of bitumen with other matters, and treating and applying certain natural bitumen or bitumens for such purposes. (A com.)
295. W. E. Newton, 66, Chancery-lane—An improved blowing machine. (A com.)

Dated 2nd February, 1859.

297. E. Wilkins, 7, Addington-place, Camberwell, Surrey—Imp. in drain pipes and tiles for draining and liquid manuring land
299. F. F. Rateau, 60, Boulevart de Strasbourg, Paris—An improved steam-engine actuated by regenerated steam.
301. S. Tearne, Birmingham—Imp. in ornamenting surfaces.
303. I. Clements, Birmingham—A new or improved method of manufacturing curtain rings.
305. G. Leach, Leeds—Imp. in leashing yarn or thread, in the hank, and in machinery for winding off the same.

Dated 3rd February, 1859.

307. T. Storer, Birmingham—A new or improved funeral carriage.
308. J. Woodrow, Oldham—Imp. in the manufacture of hats or covering for the head.
309. W. Clayton and J. Goodfellow, Blackburn—Certain imp. in metallic pistons.
310. H. C. Jennings, 8, Great Tower-street—Imp. in the manufacture of paper and artificial parchment and of gelatine, applicable to the sizeing of the same, and other purposes.
311. J. Petrie, jun., Rochdale, and T. Wrigley, Heap-bridge, Lancashire—Imp. in machinery or apparatus for washing rags, and other materials for the manufacture of paper.
312. S. D. Davison, Leith—Imp. in locomotive steam-engines.
313. A. G. Pooley, Globe Wharf, Rotherhithe—Imp. in preparing fish for manure, and in apparatus for the same.

Dated 4th February, 1859.

315. H. Greaves, 5, Victoria-street, Westminster—Imp. in the preparation of iron bars, of the various forms or sections used in the construction of sheet-iron structures, and in machinery employed for the same.
316. W. Thompson, 2, Rue Sainte Appoline, Paris—An improved printing telegraph.
317. A. Allan, Perth—Imp. in locomotive steam engines, in part applicable for retarding and stopping railway trains.
319. S. L. Trotman, Liverpool—Imp. for the more effectually securing or fastening envelopes or other like receptacles, and the more securely affixing postage stamps, or other adhesive labels.
320. R. A. Brooman, 166, Fleet-street—An imp. in cooling worts and beer. (A com.)
321. R. A. Brooman, 166, Fleet-street—Imp. in shirts. (A com.)
322. G. H. Baylis, 13, Vauxhall-walk, Lambeth, and F. Robinson, 88, Salisbury-street, Lisson-grove—An improved indicator for registering the withdrawal of liquids from vessels.
323. F. H. Maberly, Stow Market, Suffolk—Imp. in obtaining spring power, and in its application to various purposes.
324. L. Bonneau, 279, Rue Saint Denis, Paris—Imp. in apparatus for registering the time carriages are employed in conveying persons from place to place, and also in moving from place to place when occupied.
326. P. Adie, Strand—Imp. in apparatus for taking levels and measuring angles.
327. W. R. J. Packer, 4, Leinster-street, Dublin—Imp. in the plough or plough-share, for the purpose of more effectually pulverizing, breaking up, or cutting into small particles the earth or sod separated from the ground by the plough-share.
329. A. Barclay, Kilmarnock, Ayr, N.B.—Imp. in electric-magnetic or electro-magnetic telegraph ropes or conductors, and in machinery or apparatus to be used on board ship for laying or paying out the same.

Dated 5th February, 1859.

331. F. H. Maberly, Stow Market, Suffolk—Imp. in apparatus for corking, for drawing corks, in taps, in the necks of bottles, in the bung-holes of barrels, and in similar articles.
332. N. Greenhalgh, W. Shaw, and J. Mallison, jun., Bolton, Lancashire—Certain imp. in the treatment and preparation of yarns or threads previously to dyeing.
333. R. Tinkler, Penrith, Cumberland—Imp. in churns.
334. H. Anderson, Liverpool—An improved construction of apparatus for winding window blinds, sun shades, and similar articles on their rollers.
335. T. Sykes and B. C. Sykes, Cleckheaton, Yorkshire—Imp. in obtaining or separating oily, fatty, greasy, tarry, waxy, and resinous substances from oleaginous seeds, nuts and fruits, wool, silk, hair, cotton, flax, line, hemp, furs, skins, leather, bones, fish, and other animal matters and refuse, woollen and cotton waste and refuse, also textile fabrics and refuse grease, produced in various branches of industry, indigo, lac, lac dye, and other dyes.
337. M. Booth, Manchester, and J. Farmer, Salford—Imp. in sizing or stiffening woven fabrics.

Dated 7th February, 1859.

338. G. F. Chantrell, Liverpool—Imp. in the treatment of charcoal after its manufacture or revivification.
340. A. Lyons, 77, Chancery-lane—A pocket protector.
342. M. Curtis, Manchester, and J. Miller, Staley Bridge, Lancashire—Imp. in certain mules for spinning cotton and other fibrous substances.
344. T. Sims, Conduit-street, Regent-street—Imp. in the application of photography to engraving and printing.
346. J. Smith, Bradford—Imp. in machinery or apparatus for preparing and combing wool and other fibrous substances.

Dated 8th February, 1859.

348. T. Moss, 69, Fleet-street—Imp. in the manufacture of paper and printing ink, suitable for bank notes, bills of exchange, and other documents requiring like security against being copied.
352. D. E. Bagnicki, New York—An improved syringing apparatus, for curing Leucorrhea and similar sexual diseases.
354. R. R. Rowntree, Kingston-upon-Hull—A portable tea testing apparatus.
356. J. B. Redman, New Palace-yard, Westminster—An imp. in the construction of carriage ways.
358. W. Clark, 53, Chancery-lane—Improved protectors for tobacco plants. (A com.)
360. J. Juckes, Dame-street, Wharf-road, City-road, Islington—Imp. in stoves or fire-places.

WEEKLY LIST OF PATENTS SEALED.

[*From Gazette*, *Feb.* 18, 1859.]

February 18*th*.

1880. A. V. Pinta.
1887. W. F. Padwick.
1890. W. Smith.
1891. W. Pearce.
1896. P. Spence.
1897. J. L. Figgett.
1905. W. Henson.
2035. J. U. Faessler-Petzi.
2109. A. Turner.
2381. G. Kent.
2883. R. Mushet.
2921. R. Mushet.
2935. J. Broom.
2941. J. W. Child.

[*From Gazette*, *Feb.* 22, 1859.]

February 22*nd*.

1909. F. Puls.
1910. F. Puls.
1913. L. Higgins and A. Brown.
1917. J. H. Robinson.
1923. H. Wilson.
1927. T. Hill.
1933. J. Black.
1935. S. N. Rodier.
1938. T. Trotman.
1939. J. Ellisdon.
1943. H. W. Hart.
1995. J. T. Pitman.
2026. L. Pellissier & J. Puytorac.
2052. J. Knowles.
2061. L. Hill.
2089. Hon. W. E. Cochrane.
2222. J. Ridsdale.
2868. D. Rowan.
2897. J. Clegg.

Patents on which the Stamp Duty of £50 has been paid.

[*From Gazette*, *Feb.* 18, 1859.]

February 14*th*.

391. E. Oldfield.
420. W. G. Merrett.
426. W. Muir.
438. J. Barsham.

[*From Gazette*, *Feb.* 22, 1859.]

February 17*th*.

431. J. Freer.
538. R. Maynard.

February 18*th*.

434. J. H. Johnson.
479. Charles Iles.

February 19*th*.

440. I. Moll.
442. J. H. M. Maissiat.
514. C. A. de Fonbonne.